

Power Flume #1  
Tacoma Vicinity  
La Plata County  
Colorado

HAER No. CO-17

HAER  
COLO,  
33-TAC.V,  
3.

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

HAER  
COLO,  
33-TAC.V,  
3-

POWER FLUME No.1  
(Tacoma Project)  
CO-17

DATE: 1903-1905, 1927-1928

LOCATION: Tacoma Vicinity  
La Plata County, Colorado

DESIGNED BY: H.T. Henderson

OWNER: no longer extant; demolished 1980

SIGNIFICANCE: The Power Flume was an integral part of the Tacoma Hydroelectric Project in southwest Colorado. The Project was undertaken in order to produce cheap power for the mining operations at Silverton. Due to leakage, the original wood flume had to be replaced in 1927-28, by a semi-circular one made of treated Oregon fir. Both flumes were used to transport water from Electra Lake to Forebay Lake.

HISTORIAN: Colorado-Ute Electric Association, Inc.

EDITED AND  
TRANSMITTED BY: Monica E. Hawley, Historian, 1983

## Introduction

The Tacoma Project is a hydroelectric development located about 20 miles north of Durango, Colorado. It is owned and operated by Colorado-Ute Electric Association, Inc., Montrose, Colorado. The Project consists of a system of storage reservoirs, diversion dams and water conveyance conduits. The water supply for the Project comes from the Cascade, Little Cascade and Elbert Creek drainages. Water from Cascade Creek is transported to Electra Lake, storage reservoir for the Project, via a series of flumes, pipelines, canals and natural water courses (see Exhibit 1). Elbert Creek flows directly into Electra Lake. Water released from Electra Lake flows through a tunnel, a natural water course, and a flume to Forebay Lake, a regulation reservoir. Water from Forebay Lake is diverted into two riveted steel penstocks which transport it to the Tacoma Powerhouse with the tailrace discharging into the Animas River. The average static head between Forebay Lake and Tacoma Powerhouse is 948 feet and is used to generate 8,000 kW of power. Colorado-Ute plans to install 7,000 kW of additional generating capacity at the powerhouse in the near future.

The Tacoma Project is a part of the Tacoma-Ames Hydroelectric Project and is licensed by the Federal Energy Regulatory Commission (FERC). On December 12, 1978, Colorado-Ute filed an application for amendment of license, which amendment included in part: reconstruction of the Terminal Dam and removal of existing Terminal Dam, wholly or in part; reconstruction of Aspaas Dam and removal of existing Aspaas Dam, wholly or in part; construction of approximately 9,700 feet of 66-inch pipeline between Terminal Dam and Forebay Lake and removal of existing Power Flume No. 1.

Terminal and Aspaas Dams are timber-crib, rock-filled structures that have required extensive maintenance, and have deteriorated to a point that replacement is required. Power Flume No. 1 is being replaced due to high maintenance costs, short-life expectancy and a need for additional water carrying capacity. Terminal and Aspaas Dams and Power Flume No. 1 were determined to be eligible for listing on the National Register of Historic Places. Since these structures will be removed, it was determined by the Federal Energy Regulatory Commission and the Colorado State Historic Preservation Officer that documentation of these structures to National Architectural and Engineering Record Standards (NAER) would constitute adequate mitigation. This report has been prepared to document the project to NAER standards.

## Historical Background

The Tacoma Project was constructed in the early 1900s to serve mining loads in the Silverton mining district, located approximately 50 miles north of the Project in the San Juan Mountains. Several mines in the Silverton area had been forced to close due to the high cost of steam power used in their mining operations. Coal had to be brought in by mule pack trains over extremely rugged terrain; and as a result, steam power costs were about \$175.00 per horsepower per year. (1) A man named H. T. Henderson believed power could be supplied to the mines for \$40.00 to \$60.00 per horsepower per year by using locally generated hydroelectricity and transmission lines. (2)

H. T. Henderson, a civil engineer, had moved to the Durango, Colorado area from Tennessee around the turn of the century. Henderson studied the Ames hydroelectric facilities near Telluride, Colorado, northwest of Silverton, that had been developed by L. L. Nunn and witnessed how it had benefited mining operations in the Telluride District. He hoped to provide the same benefits for mines in the Silverton District. Henderson learned of the steep walled Animas River Canyon north of Durango and looked for a reservoir site to the west of the river on the plateau 1,000 feet above the Animas River where water could be stored and converted to power by gravity. (3)

Once Henderson located a suitable site, he organized investors in Tennessee and Indiana to finance the project. On November 10, 1902, H. T. Henderson, J. W. Adams and A. H. Mundee incorporated the Animas Canal, Reservoir, Water, Power and Investment Company for the purpose of building a hydroelectric power plant and supplying power to the mines in the Silverton District. (4)

Plans and specifications were drawn up and work began in the spring of 1903. Work on the Cascade Flume, Terminal Dam, and Power Flume No. 1 were started concurrently. Construction on all three structures was completed by the summer of 1905. During 1905, construction of the Tacoma Powerhouse on the west bank of the Animas River was initiated; the penstock between the Forebay Lake and Powerhouse was installed; and construction of a 44,000 volt transmission line between the Powerhouse and the substation at Silverton was initiated. (5)

The Animas Canal, Reservoir, Water, Power and Investment Company encountered financial difficulties and was reorganized and reincorporated as the Animas Power and Water Company in 1905. The Animas Power and Water Company took over the partially completed project and finished it, with the first power being produced and delivered in May of 1906. (6)

Documentation of Power Flume No. 1

Power Flume No. 1 was used to transport water from Electra Lake to Forebay Lake. The original power flume was constructed between 1903 and late 1905 by the Animas Canal, Reservoir, Water, Power and Investment Company. It appears the original flume was designed by H. T. Henderson, Chief Engineer, as the only available blueprint of the structure originated in his office (see Exhibit 6). In 1903 Henderson estimated the cost of construction for the flume would be \$20,430.00. (7)

The original flume was a wooden, rectangular structure measuring 56 inches wide and 38 inches deep. Details of its dimensions are found in Exhibit 6. The flume was 8,800 feet in length and laid on a grade of 0.25 percent and supported by timber bents. (8)

By 1927 the original flume required replacement. The wood for the original flume was not treated with a preservative and the alternate wetting and drying of the wood had caused it to deteriorate. The flume was leaking three cubic feet per second (cfs) and its capacity was about 60 cfs as compared to a designed capacity of 75 cfs.

The flume that existed in 1980 was constructed during the summers of 1927 and 1928 by the Western Colorado Power Company. The lower 4,200 feet of the flume was constructed in 1927 and the remainder in 1928. This flume was constructed on a different grade and alignment to allow continued use of the original flume during construction.

The flume was a semi-circular wood stave flume 6 feet in diameter made of creosoted Oregon fir. It was about 7,600 feet in length and was constructed on an average gradient of 0.002 foot per foot. The flume was supported by timber bents on 8 foot centers. The flume had a capacity of about 100 cfs with a 3 foot depth of flow. Exhibit 7 gives details and dimensions of the flume.

Footnotes

- (1) Western Colorado Power Company, "Statement A - History of Origin and Development," from Reclassification of Electric Plant - Statements A to I Inclusive, 1944, p. 57.
- (2) "Reclassification of Electric Plant," p. 57.
- (3) "Reclassification of Electric Plant," p. 57-58.
- (4) "Reclassification of Electric Plant," p. 58.
- (5) "Reclassification of Electric Plant," p. 62-65.
- (6) "Reclassification of Electric Plant," p. 62-65.
- (7) From a document located in the Western Colorado Power Company Collection, Center of Southwest Studies, Fort Lewis College, Durango, Colorado..
- (8) George M. Peek, "The Hydraulic Power Development of the Animas Power and Water Co." in The Engineering Record, Vol. 53, No. 15, 1906, p. 486.